

ABSTRACT

A multi-column electron beam inspection system is disclosed herein. The system is designed for electron beam inspection of semiconductor wafers with throughput high enough for *in-line* use. The system includes field emission electron
5 sources, electrostatic electron optical columns, a wafer stage with six degrees of freedom of movement, and image storage and processing systems capable of handling multiple simultaneous image data streams. Each electron optical column is enhanced with an electron gun with redundant field emission sources, a voltage contrast plate to allow voltage contrast imaging of wafers, and an electron optical
10 design for high efficiency secondary electron collection.